LOBSTER RESEARCH PROGRAM

MAINE DEPARTMENT OF MARINE RESOURCES

"FACTS BEHIND THE LOBSTER ESCAPE VENT LAW"

by

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"Facts Behind the Lobster Escape Vent Law"

Several years ago (1971-73) DMR biologists, while collecting catch
and effort information aboard commercial lobster boats along the Maine
coast, noticed excessive numbers of sublegal-sized lobsters being removed
from traps and returned to the sea by fishermen. When one considers that
Maine lobstermen presently haul their traps more than 20 million times
each year, the magnitude of this sorting becomes apparent. Lobstermen
not only lessen the efficiency of their fishing operations by needlessly
handling short lobsters, but the chances are increased of these lobsters
becoming a cull (missing claw[s]) or a victim to predatory fish while
descending to the ocean floor, which in either case represents an economic
loss to the industry. A recent study by DMR estimated that the 1974
lobster catch lost about $500,000 due to the lower value of culls (see
September 1977 issue of *Maine Commercial Fisherman*).

A solution to this detrimental fishing practice became apparent to
us upon checking data from earlier boat trips which indicated that traps
with wider lath spaces retain fewer short lobsters. Canadian scientists
have long advocated the use of wider lath spacings to allow escapement of
sublegals. Presently, only Newfoundland has a vent regulation (1-3/4
inches), but it appears likely that vents will soon be required in other
Canadian provinces. Similarly, the states of Massachusetts, Delaware, and
North Carolina recently enacted escape vent legislation.

Because of the management implications of this association between
lath spacing and size composition of the catch, DMR undertook an investi-
gation to objectively assess this situation with several independent
approaches, namely: 1) a trap escapement study; 2) an analysis of certain

body dimensions of lobsters; 3) an evaluation of size composition of
lobsters caught in commercial traps with various size escape vents and
4) a comparison of lobsters caught by lobstermen with traps having
different lath spacings.

From 1971 through 1973, we spent 21 days riding aboard nine different
commercial lobster boats from four coastal areas. Some of the data
gathered aboard these boats has been summarized in Table 1. For instance,
the total catch for all boats was 12,071 lobsters of which there were
2,311 legals. The throw-back ratios of illegal to legal lobsters, which
ranged from 1.8 to 12.4:1, confirmed our earlier observations that a
considerable number of lobsters are being handled needlessly. It should
also be noted that generally more shorts were caught in traps with the
smaller vent spacings.

To determine what size lath spacing is necessary to allow the
escapement of most short lobsters yet still retain all legals, we con-
ducted a trap escapement study whereby lobsters of known sizes were
placed in wooden traps with plastic vents of 1-1/4, 1-1/2, 1-3/4, and
2 inches (Figure 1A). Because the heads were sealed, any escapement
had to occur through the vents. Retention of sublegals was high for
the 1-1/4 and 1-1/2 in. traps, while most shorts were able to escape
from traps with the 1-3/4 and 2 in. vents (Figure 2). With the present
minimum size of 3-3/16 in., a 2 in. vent would be unsatisfactory as many
legals could escape, whereas escapement of legals through a 1-3/4 in.
vent would be extremely minimal.

The escapement of lobsters through various size openings depends
upon certain body dimensions such as carapace length, width, and height.

We contend that the width of the carapace is more important than height since we observed that lobsters, attempting to escape through different lath spacings, would twist on their sides when encountering a tight fit between laths. In view of this, we mathematically evaluated the association between carapace length and width (Figure 3). According to this relationship, lobsters at the minimum legal size of 3-3/16 in. (81 mm) carapace length would be expected to have an average carapace width of 1.90 in. with individual widths varying 95% of the time from 1.80 to 2.00 in. The magnitude of these measurements (all greater than 1-3/4 in.) suggests that only a very small percentage of legal-sized lobsters might escape through a 1-3/4 in. vent.

Catches with modified commercial traps revealed that traps with smaller vents retained considerably more shorts for every legal lobster caught (Table 2). Overall catches with traps having a 1-3/4 in. vent always consisted of more legal than short lobsters while this size composition is reversed in the catches from traps with smaller vents. This further substantiates our contention that excessive handling of short lobsters can be minimized with the addition of a 1-3/4 in. vent to all lobster traps.

Although rectangular escape vents of 1-3/4 in. would undoubtedly benefit the Maine lobster fishery, this vent will not retain all the marketable-sized rock (*Cancer irroratus*) and Jonah crabs (*C. borealis*). Since these two species of crab, which are often caught incidental to lobsters, constitute a small but nevertheless important commercial fishery, we undertook another study to find an escape opening that would retain harvestable-sized crabs and still have similar fishing

selectivities for lobsters as the rectangular vent.

Using essentially the same methods as those discussed previously for assessing the rectangular vent, we determined that an escape panel comprised of two circular openings not less than 2.28 in. (58 mm) in diameter (Figure 1B) would insure maximum escapement of short lobsters and still retain all legal lobsters and marketable-sized crabs.

In view of these findings, DMR has recommended that all lobster and crab traps fished in Maine waters have a rectangular escape vent not less than 1.75 in. (44.5 mm) by 6 in. (152.4 mm) or at least two circular escape openings not less than 2.28 in. (58 mm) in diameter. To maximize escapement of sublegal lobsters, vents should be installed next to the sill on the side or end of the trap's parlor section.

Although fishermen should certainly have the option to fabricate their own vents, provided that the presecribed dimensions are adhered to, the use of synthetic, prefabricated vents appears advantageous. Considering that plastic vents are now available for about 25¢ each and with today's high price of laths (about 5¢ each), if a synthetic vent replaces two laths every three years, then after six years the original cost of the vent will almost be defrayed by the replacement cost of the laths, resulting in a cost savings.

Acting in accordance with the aforementioned recommendations, the Maine State Legislature has recently adopted a vent law which is scheduled to become effective 1 January 1979. The specifics of this law can be obtained by contacting either the DMR office in Hallowell or your local coastal warden.

Detailed reports on DMR vent studies are available from Jay S. Krouse, Department of Marine Resources, West Boothbay Harbor, Maine
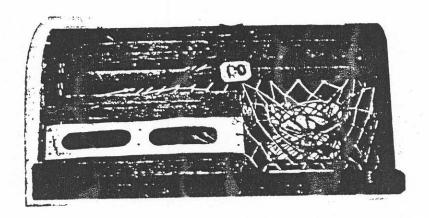
Table 2. Ratios of short to legal lobsters captured in traps with various size vents. Actual numbers of sublegal and legal lobsters appear in parentheses.

Year	1 x 1 (wire)	Vent size (inches)		
		1-1/2	1-5/8	1-3/4
1972	11.7:1 (962:82)	3.9:1 (71:18)	2.6:1 (78:30)	0.8:1 (21:28)
1973	28.9:1 (927:33)	5.9:1 (164:28)	1.4:1 (133:92)	0.8:1 (104:136)

Table 1. Some catch and effort statistics of 21 daily trips aboard commercial fishing boats (September 1971 through September 1973).

Area boat trip (Date of trip)	Total no. lobsters	Illegals: Legals	Legals per trap haul	Shorts per trap haul	Trap lath spacing (inches)
Boothbay:					
1. (Sept. 71)	434	10.4:1	0.3	3.0	1.25
2. (Oct. 71)	298	8.3:1	0.3	2.2	1.25
3. (Aug. 72)	642	2.4:1	0.6	1.4	1.62
4. (Aug. 72)	109	8.1:1	0.4	3.3	1.25
5. (Aug. 72)	696	2.6:1	0.6	1.6	1.62
6. (Sept. 72)	428	12.4:1	0.1	1.6	1.25
7. (July 73)	624	1.8:1	0.7	1.3	1.62
8. (Aug. 73)	637	2.9:1	0.7	1.8	1.62
9. (Sept. 73)	340	8.7:1	0.3	2.3	1.25
Medomak:					
10. (Sept. 71)	1,247	5.6:1	0.8	4.2	-
11. (Nov. 71)	1,606	3.5:1	1.3	4.6	-
12. (Sept. 72)	1,234	4.5:1	1.0	4.2	1.25-1.50
13. (Sept. 73)	926	3.6:1	1.3	4.7	1.25-1.50
Jonesport:					
14. (July 72)	277	7.2:1	0.2	1.2	-
15. (Aug. 72)	244	5.8:1	0.2	1.4	-
16. (Sept. 72)	291	3.3:1	0.5	1.5	1.25
Newagen:					
17. (Aug. 72)	441	11.6:1	0.3	3.0	1.13-1.25
18. (June 73)	186	8.3:1	0.2	1.5	1.13-1.62
19. (July 73)	329	4.9:1	0.4	2.1	1.13-1.62
Cundy's:					
20. (Sept. 72)	554	9.7:1	0.3	2.9	1.75
21. (Sept. 73)	528	3.2:1	0.5	1.7	1.75
TOTAL	12,071	4.2:1	0.6	2.4	1.13-1.75

A

B
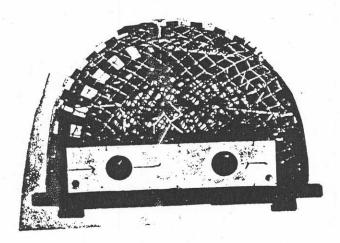
Figure 1. Commercial lobster traps equipped with rectangular (A) and circular (B) escape vents.

PERCENT RETAINED

100
90
80
70
60
50
40
30
20
10

60   70   80   90

CARAPACE LENGTH (MM)

1½"
N=38

1¼"
N=20

1¾"
N=80

2"
N=42

MINIMUM
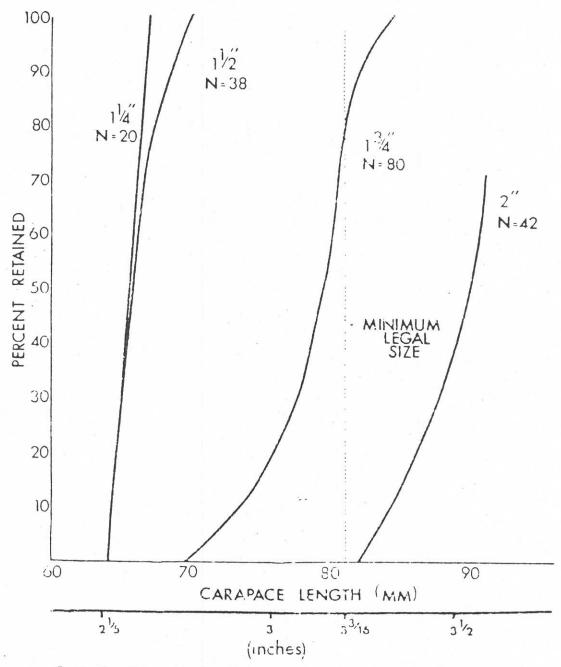LEGAL
SIZE

2⅕   3   3³⁄₁₆   3½

(inches)

Figure 2. Curves showing the percentages of various size lobsters retained
in modified commerical traps with 1 1/4, 1 1/2, 1 3/4 and 2 inch
vent dimensions.

Figure 3. Carapace length-width relationship for lobsters ranging in back shell length from about 2 3/4 to 3 1/2 in. trap.